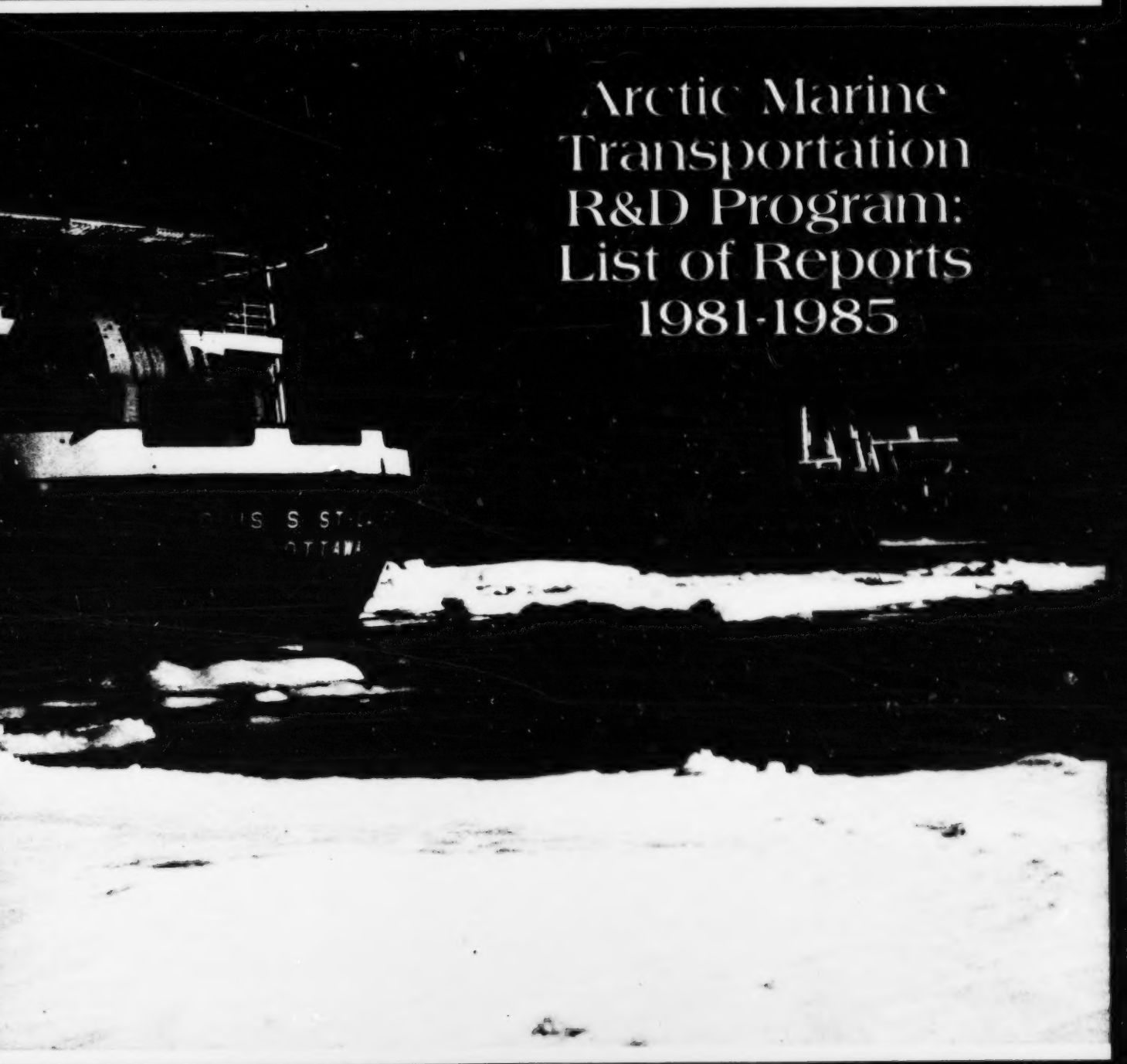


Transport
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Arctic Marine Transportation R&D Program: List of Reports 1981-1985

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ARCTIC MARINE TRANSPORTATION R&D PROGRAM:

List of Reports 1981-1985

March 1986



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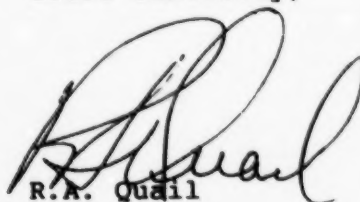
To whom it may concern:

This report, entitled ARCTIC MARINE TRANSPORTATION R&D PROGRAM: List of Reports, 1981-1985 has been prepared for the information of all members of the marine community who might have an interest in the results of the Arctic Marine Transportation Research and Development Program, which has been underway since 1981.

The Arctic Marine Transportation R&D Program was put in place to allow three departments -- Transport Canada, Department of Fisheries and Oceans and Environment Canada -- to establish appropriate regulations, and in conjunction with industry, more efficient and effective services necessary to permit safe shipments of Arctic resources on a year round basis. Details on this program are available from marine officials identified elsewhere in this report.

This report contains a listing of reports issued to date by each of the three departments. Some of the projects which have resulted in reports have been co-funded with other programs such as the Program for Energy R&D (PERD) and the Northern Oil and Gas Action Program (NOGAP). I acknowledge the contribution these programs have made in assisting all of us to better understand and manage the Arctic.

Yours sincerely,



R.A. Quail

Canada

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In motion...in touch



C'est notre année!
en mouvement...au courant

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This document was prepared by the Marine R&D/Energy Group of Transport Canada (CMRD) based on the best information available from internal management systems. Any errors or omissions should be addressed to:

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INTRODUCTION

This report has been prepared for the information of all members of the marine community -- government, provinces, ship owners, operators, builders, marine equipment manufacturers, offshore operators and anyone else who might have an interest in the results of the Arctic Marine Transportation Research and Development Program, which has been underway since 1981.

The program was put in place to allow three departments -- Transport Canada, Department of Fisheries and Oceans and Environment Canada -- to establish appropriate regulations, and in conjunction with industry, more efficient and effective services necessary to permit Safe Shipments of Arctic resources on a year round basis.

The report contains a listing of reports issued to date by each of the three departments. Some of the projects which have resulted in reports have been co-funded with other programs such as the Program for Energy R&D (PERD) and the Northern Oil and Gas Action Program (NOGAP).

The reports are listed by Arctic Marine Project number and have been subdivided to coincide with the five tactical objectives of the program:

1. Regulatory: Design (page 1)

The work undertaken under this objective comprises field trials, laboratory tests and simulations to investigate and analyse all alternative approaches in order to acquire the additional knowledge necessary to review and, where appropriate, delete, add to or amend, regulations under the Arctic Waters Pollution Prevention Act and other codes and guidelines which relate to the design of arctic class vessels and other marine structures. The work includes hull design criteria, external and structural materials and assembly, ice class propellers and housing, ice class rudders and steering gears, ship propulsion systems, protection of exposed machinery and equipment, crew accommodations, design of arctic class fishing vessels, wharf construction and equipment and offshore drilling units.

2. Regulatory: Operations (page 9)

This work comprises field trials, laboratory tests and simulations to investigate and analyse all alternative approaches in order to acquire the knowledge necessary to review, and, where appropriate, delete, add to or amend regulations under the Arctic Waters Pollution Prevention Act and other codes and guidelines which relate to the operation and maintenance of vessels in Canada's arctic waterways, including the specifications for safety and emergency equipment required by these vessels. It includes work on operating procedures, emergency and rescue procedures, safety and emergency equipment, staffing and training, survey, repair and salvage and operation of arctic class fishing vessels.

3. Regulatory: General (page 11)

The work undertaken in this category involves the collation, analysis and interpretation of data collected within the Arctic Marine Transportation Research and Development Program and the collection of further data on social, economic and ecological impacts in order to identify and delineate regulatory implications for classification of areas and vessels, for restriction of navigational routes, and for design and operation of navigational routes, and for design and operation of vessels and other marine structures. The work includes classification of arctic vessels and areas, social, economic and ecological impacts, stationary vessels, operating routes and regulatory overview.

4. Operation of Vessels (page 12)

This work is aimed at increasing the safety and efficiency of vessels operating in all seasons in arctic waterways by acquiring increased knowledge of design and operational requirements and by developing required ship-based systems and equipment. It includes work in the following areas: ship based ice hazard detection methods and equipment, communications systems and technologies, ship monitoring and warning systems, arctic navigational systems and methods, ship ballasting, refuelling, crew training, and general design and operating information.

5. Government Services (page 15)

The purpose of this work is to make safe and efficient navigation of Canada's arctic waterways feasible in all seasons by acquiring the necessary basic knowledge and developing the systems and products required to provide year round government marine services effectively and efficiently. The work includes arctic charting equipment, remote ice measurement, arctic climatology, local ice movement and distribution, weather, sea state and ice forecasting, ice management, ice transiting and icebreaking techniques, arctic class nav-aids, ship movement planning and monitoring, and oil spill detection, containment and clean-up.

A sequential listing of reports is also provided for reports which relate to work undertaken for Transport Canada. The reports are listed by TP (Transport Publication) number. TP numbers are assigned to all reports issued by, or under the auspices of Transport Canada.

The symbol (R) following the listing for certain reports indicates that distribution of the report is restricted.

**LISTING OF REPORTS BY
TACTICAL OBJECTIVE**

1. REGULATORY: DESIGN

2003 Hull Strength Polar Sea

- TP 3617 - Winter 1981 Trafficability Tests of the USCGC Polar Sea - Ice Induced Vibration Measurements & Development of a Model for Icebreaking, Excitation Forces, Volume 9A - Main Report, Arctec Canada Ltd., April 1982. (R)
- TP 4080 - Winter 1981 Trafficability Tests of the USCGC Polar Sea, Volume 9C - Records and Data, Arctec Canada Ltd., March 1982. (R)
- TP 4081 - Winter 1981 Trafficability Tests of the USCGC Polar Sea, Volume 9B - Calculations and Analysis, Arctec Canada Ltd., March 1982. (R)

2004 Ice Loads on Rudders and Steering Gears: Polar Class

- TP 4125 - Arctic Development of USCGC Polar Sea Winter 1982 - Volume VI - Ice Loads and Steering Gears Systems, Arctec Canada Ltd, September 1982.

2005 Polar Sea and Polar Star: Ice Loads and Response Criteria

- TP 6038 - Ice Loads and Ship Response to Ice: USCG Polar Class 1982/83 Deployment, Arctec Canada Ltd., Summary Report, 1984.
- TP 6039 - Ice Loads and Ship Response to Ice: USCG Polar Class Summer Deployment, Volume I & II (Appendices), Arctec Canada Ltd., 1984.
- TP 7183 - Polar Class Antarctic 1984, Level Ice Resistance Tests, Arctec Canada Ltd., 1985. (R)
- TP 7184 - Polar Class Antarctic 1984, Ice Impact Tests, Arctec Canada Ltd., 1985. (R)

2007 Rudders, Stocks, Steering and Manoeuvrability

- TP 5372 - Study of Rudder, Rudder Stocks, Steering Gears and Manoeuvrability of Arctic Class Ships, Arctec Canada Ltd., April 1984. (R)
- TP 6250 - Rudder and Steering Gear Load Measurements on CCGS Pierre Radisson, Arctec Canada Ltd., March 1985. (R)

2008 Dome MV Canmar Kigoriak

- Full Scale Measurements of the Ice Impact Loads and Response of the Kigoriak, August and October 1981, Dome Petroleum Ltd., December 1982. (R)

TP 5869 - Report on Analysis of Data Gathered During the M.V. Canmar Kigoriak Ice Impact Trials Carried Out in October 1981, Dome Petroleum Ltd., October 1984.

TP 5870 - Ice Data, Beaufort Sea, August and October 1981, Dome Petroleum Ltd., October 1984.

TP 5871 - Canmar Kigoriak and Arctic Experimental Class 4 Icebreaker Research Program, Dome Petroleum Ltd., October 1984.

2009 Hull Structure Field Tests M.V. Arctic

- TP 6270 - M.V. Arctic Dedicated Field Tests - Ship/Ice Interaction (Ramming Results and Analysis), German & Milne Inc. and Technical Research Centre of Finland (VTT), January 1985. (R)

2010 Polar 8 Icebreaker Deployment R&D

- Polar 8 Icebreaker Scientific Data Acquisition System Study, Arctec Canada Ltd.

2011 M.V. Arctic Hull Girder Stress Investigation

TP 5888 - Measurement of the Hull Girder Bending Strain and Vibration in the Hull of the M.V. Arctic on the Voyage to Strathcona Sound, (June 1982), Melville Shipping Ltd., September, 1982. (R)

TP 6750 - Measurement of Hull Girder Bending Strain and Vibration in the Hull of the M.V. Arctic in Admiralty Inlet on the Voyage to Strathcona Sound (July 1981): Final Report, Melville Shipping Ltd., June 1982, Volume 1. (R)

2012 M.V. Arctic Vibratory Response, Design Loads and Criteria

TP 6754 - Measurement of Hull Girder Strains and Vibration During Ramming of the Multi-Year Ice Floes in Lancaster Sound (November 1981), Melville Marine Consultancy, March 1983. (R)

TP 5891 - Continuation of Stress Analysis of M.V. Arctic Dynamic Exciter Tests: Interim Report, Melville Shipping Ltd., March 1982. (R)

**2012 M.V. Arctic Vibratory Response, Design Loads and Criteria
(Cont'd)**

- TP 6749 - Continuation of Stress Analysis Measurement:
Recording of Deck and Bottom Stresses on M.V.
Arctic During a Trans-Atlantic Crossing, Melville
Shipping Ltd., July 1982. (R)
- TP 6755 - Continuation of Stress Analysis: M.V. Arctic Hull
Girder Stress and Vibratory Response During
Ship-Ice Interaction, Melville Shipping Ltd.,
July 1982. (R)
- TP 6753 - Continuation of Stress Analysis: Interim Report on
Mathematical Model of the Hull Girder Structure of
the M.V. Arctic, Melville Shipping Ltd.,
March 1982. (R)

2014 M.V. Arctic Data: Dedicated Analysis

- TP 6345 - M.V. Arctic Scientific Program 1979-1981
Performance Review, Pierce Operational Dynamics
Inc., July 1985.
- TP 4792 - M.V. Arctic Scientific Program: Interim Report,
Pierce Operational Dynamics Inc., July 1983.
- TP 5320 &
TP 5321 - M.V. Arctic Ice Transiting Performance in the
Ramming Mode, Arctec Canada Ltd., October 1984. (R)
- TP 5170 &
TP 5319 - M.V. Arctic Ice Transiting Performance, Continuous
Mode, Albery, Pullerits, Dickson & Associates, May
1984. (R)
- TP 5683 &
TP 5684 - M.V. Arctic Manoeuvring Performance in Ice, German
& Milne Inc., September 1984. (R)
- TP 5680 &
TP 5682 - M.V. Arctic Structural Performance, Arctec Canada
Ltd., April 1985. (R)
- TP 5167 &
TP 5168 - M.V. Arctic Propulsive Performance: Final Report,
Melville Shipping Ltd., March 1984. (R)

2015 M.V. Arctic: Statistical Measuring System

- TP 6775 - Results from Statistical Measuring System on Board
M.V. Arctic (1982), Technical Research Centre of
Finland (VTT), July 1983. (R)

2015 M.V. Arctic: Statistical Measuring System (Cont'd)

- TP 6699 - Results from Statistical Measuring System on Board M.V. Arctic 1983, VTT, March 1984. (R)
- TP 6572 - Results from Statistical Measuring System on Board M.V. Arctic 1984, German & Milne Inc., 1984. (R)

2017 M.V. Arctic: Optimization of Bow Form

- TP 4192 - M.V. Arctic Bow Redesign Study: Phase I (1983), Melville Shipping Ltd., January 1983.
- TP 5455 &
TP 5456 - Redesign of the M.V. Arctic Bow: Design and Model Testing, Melville Shipping Ltd., 1984.
- TP 5812 - Redesign of the M.V. Arctic Bow: Additional Model Tests at HSVA and WARC, Melville Shipping Ltd., May 1985.
- TP 6430 - M.V. Arctic and Two Alternative Bow Designs: Results of Seakeeping and Slamming Experiments with Model Hulls 361A, 361B and 361C, Institute of Marine Dynamics, NRC, October 1984.
- TP 5044 - M.V. Arctic and Two Alternative Bow Designs: Results of Resistance, Propulsion and Overload Experiments with Model Hulls 326, 326B and 326C, and Model Propeller 68, AVMRI (now IMD), NRC, May 1983.

2018 M.V. Arctic Non-Destructive Testing

- Report on the Non-Destructive Testing Program Carried Out on the M.V. Arctic in June 1982. (R)

2019 M.V. Arctic Destructive Testing

- Arctic Steel Samples Test Report (R)
- TP 5890 - Continuation of Stress Analysis Fatigue Tests of Deck Plate Samples from the M.V. Arctic, Melville Shipping Ltd., October 1984. (R)

2023 M.V. Arctic: Monitoring of Machinery Requirements

- TP 6767 - M.V. Arctic Machinery Vibration (O/D Box), Arctec Canada Ltd., February 1983. (R)

2024 Development of a Semi-Empirical Ice Resistance Model

- TP 4376 - A Semi-Empirical Ice Resistance Model, Main Report, Arctec Canada Ltd., 1983. (R)
- TP 4377 - A Semi-Empirical Ice Resistance Model, Summary Report, Arctec Canada Ltd., 1983. (R)
- TP 4375 - A Semi-Empirical Ice Resistance Model, Appendices, Arctec Canada Ltd., 1983. (R)
- TP 4374 - A Semi-Empirical Ice Resistance Model, Principles and Assumptions, Arctec Canada Ltd., 1983. (R)

2025 Ship Structural Reponse Model

- TP 4991 - Development of a Prediction Model for Dynamic Response and Bow Loading of Ships, Melville Shipping Ltd., May 1983. (R)

2027 Nozzle Propeller Ice Force

- TP 5685 - The Robert Lemeur Nozzle Propeller Ice Force Measurement Project, Final Report, Canadian Marine Drilling Ltd.

2029 Propeller Protection In Ice

- TP 2704 - Protection of Propellers in Ice, Davis Engineering Ltd., January 1983, Volume I: Assessment of Protection Schemes, Volume II: Detailed Design of Protection Schemes, Volume III: Tests Results, Analysis and Discussion.

2031 Structural Steel Standards

- TP 6124 - Canadian Sub-Arctic Temperature Parameters for Structural Steel Standards, Arctec Canada Ltd., 1984.
- TP 5882 - Interim Structural Standards for Arctic Class Ships, Evaluation and Commentary on Discussion Paper, Det Norske Veritas, October 1984. (R)

2039 M.V. Arctic: Heat Flow Measurements

- TP 5001 - Modelling of Heat Flow in Ships, H.G. Engineering Ltd., September 1983.

2043 Arctic Shipping Probability Evaluation Network (ASPEN)

TP 6274 - Studies in Connection with Updating the ASPPR Group IV: Further Development of Ship/Ice Collision Probability Model, ASPEN, Final Report, Arctec Canada Ltd., March 1985.

(R)

TP 6671 - Review and Proposed Revision of Hull Structural Requirements of the ASPPR, July 1985.

2045 Offshore Drilling Unit Standards

TP 4891 - Interim Standards Respecting Mobile Offshore Drill Unit, 1984.

2046 Wave Climate Documentation Study - Arctic and Offshore

TP 3868 - Wave Climate Documentation Study, W.F. Baird & Associates, August 1982.

2047 Fishing Vessels in the Arctic and Sub-Arctic

TP 5375 - Study of Regulatory Requirements of Fishing Vessels Operating in the Arctic and Sub-Arctic Sea Areas of Canada, Arctec Canada Ltd., July 1984.

2049 Load Lines and Stability - Arctic Ships

TP 5374 - Load Lines and Stability for Arctic Class Ships, Det Norske Veritas, Canada, June 1984.

TP 6329 - Damaged Stability Criteria for Vessels Operating in the Shipping Control Zones, Arctec Canada Ltd.

2053 Crew Accommodation

TP 5362 - Crew Accommodation on Arctic Class Ships, Melville Shipping Ltd., May 1984.

2073 Construction Standards: Arctic Ports

TP 5727 - Arctic Marine Design and Construction Handbook (2 Volumes), Fenco Engineers Inc., September 1984.

2094 Joint projects with Canadian Marine Drilling Ltd.

TP 6028 - Kigoriak and Robert Lemeur 1983 Full Scale Ice Impact Tests, (2 Volumes and Summary Report), Canadian Marine Drilling Ltd., February 1985.

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2094 Joint projects with Canadian Marine Drilling Ltd. (Cont'd)

TP 5399 - Kigoriak and Robert Lemeur 1983 Full Scale Ice Impact Tests, Completion of the Experiment, Testing and Preliminary Data Analysis, Canadian Marine Drilling Ltd., 1984.

2101 Ice Crushing Strength Research

TP 4297 - Development of a Field Technique to Measure the "In Situ" Crushing Strength of Ice, Phase II, March 1983.

2102 Ice Failure Modes

TP 6713 - Ice Load Penetration Model Report 1 - Constituents for Structure - Ice Interaction Modelling, National Research Council Canada and Technical Research Centre of Finland, 1985.

TP 6991 - Temperature and Rate Sensivity of Uniaxial Unconfined Compressive Strength of Multi-Year Pressure Ridge Ice, National Research Council, September 1985.

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TP 7218 - Laboratory Testing Program, Constant Strain Rate Triaxial Strength Tests on Multi-Year Ice, Final Report, GEOTECHNICAL Resources Ltd. (for NRC), November 1985.

2104 Speed/Power Loss of Vessels in Ice Infested Waters

TP 5755 - Study of Speed/Power Loss of Vessels in Ice Infested Waters, August 1984.

2109 M.V. Arctic: Brittle Fracture

TP 4516 - Evaluation of Steel Grades for M.V. Arctic, Det Norske Veritas, June 1983.

(R)

TP 6766 - Brittle Fracture Risk Assessment of M.V. Arctic, Technical Research Centre of Finland, June 1983.

(R)

2129 Modelling of Broken Ice Around Icebreakers

TP 5373 - Modelling the Broken Channel, Canadian Marine Drilling Ltd. and Arctec Canada Ltd., Final Report, July 1984.

2131 Ice Loads on Fishing Vessels

TP 6045 &

TP 6046 - Measurement of Ice Forces on Fishing Vessels, Arectec Canada Ltd. and Fisheries Resources Development Ltd., July 1984.

2146 Nozzle Propeller Ice Forces II

TP 6838 - Study of Strength Requirements for Nozzles for Ice Transiting Ships, Summary Report, Canadian Marine Drilling Ltd., July 1985.

TP 6839 - Measurement of Ice/Propeller Interaction Parameters, MV Robert Lemeur, Main Report, Canadian Marine Drilling Ltd., August 1985.

TP 6840 - Measurement of Ice/Propeller Interaction Parameters, MV Robert Lemeur, Appendices, Canadian Marine Drilling Ltd., August 1985.

TP 6841 - Measurement of Ice/Propeller Interaction Parameters, MV Robert Lemeur, Supplementary Analysis, Canadian Marine Drilling Ltd., (not yet available)

TP 6842 - Measurement of Ice/Propeller Interaction Parameters, MV Robert Lemeur, Engineering and Field Tests, Canadian Marine Drilling Ltd., August 1985.

TP 6843 - Measurement of Ice/Propeller Interaction Parameters, MV Robert Lemeur, Summary Report, Canadian Marine Drilling Ltd., August 1985.

2. REGULATORY: OPERATIONS

2047 Fishing Vessels in the Arctic and Sub-Arctic

TP 5375 - Study of Regulatory Requirements of Fishing Vessels Operating in the Arctic and Sub-Arctic Sea Areas of Canada, Arctec Canada Ltd., July 1984.

2049 Load Lines and Stability

TP 6329 - Damaged Stability Criteria for Vessels Operating in the Shipping Control Zones, Arctec Canada Ltd., 1985.

TP 5374 - Load Lines and Stability for Arctic Class Ships, Det Norske Veritas, Canada, June 1984.

2051 Arctic Operations - Manning

- Personnel Considerations in the Safe Operation of Ships Transiting the Canadian Arctic, Melville Marine Consultancy.

2054 Survey Methods and Salvage Techniques

TP 5363 - Survey, Repair and Salvage Techniques in the Arctic, Melville Shipping Ltd., July 1984.

2064 Marine Simulator: R&D Options

TP 5623 - Ergonomic and Research Applications in the Development of an Arctic Shiphandling Simulator, Volumes I and II, Man Machine Systems Ltd, February 1985.

2071 Arctic Lifesaving, Survival and Rescue

TP 5028 - Lifespan and Durability of Inflatable Liferrafts, Melville Shipping Ltd., November 1983.

TP 5029 - Lifeboat and Liferaft Equipment Requirements on Board Ships, Melville Shipping Ltd., November 1983.

TP 6903 - Safety and Survival in Arctic Class Vessels, Report on Field Tests Conducted Aboard USCG Polar Sea, Winter Deployment, Arctec Canada Ltd., July, 1985.

2096 Diesel Engines

TP 7296 - Study of Reliability and Suitability of Lifeboat Engines, Hawker Siddeley, October 1983.

(R)

2016 Preproject Studies for a CG Shiphandling Simulator

- Canadian Shipping Simulator Requirements, Arctec Canada Ltd., July 1984.

2116 Arctic Survival Capsule

- TP 4438 - Concepts for Marine Survival Capsule, Bert Van Leeuwen Industrial Design Ltd., 1983.

2125 Lifesaving Equipment for Arctic Ships

- TP 5361 - Lifesaving Equipment for Arctic Class Ships, Melville Shipping Ltd., July 1984.
- TP 6903 - Safety and Survival in Arctic Class Ships, Report on Field Trials Conducted Aboard USCG Polar Sea, Winter Deployment, Arctec Canada Ltd., July 1985.

3. REGULATORY: GENERAL.

2043 Arctic Shipping Probability Evaluation Network (ASPEN)

TP 6274 - Studies in Connection with Updating the ASPPR
Group IV: Further Development of Ship/Ice
Collision Probability Model, ASPEN, Final Report,
Arctec Canada Ltd., March 1985. (R)

TP 6276 - Shipboard Data Collection Studies in Support of
the ASPEN Model, Arctec Canada Ltd., March 1985. (R)

2044 Regulatory Overview

TP 6671 - Review and Proposed Revision of Hull Structural
Requirements of the ASPPR, July 1985.

2111 M.V. Columbialand: Trafficability

TP 5887 - 1982 Navigability Study - M.V. Columbialand,
Martec Ltd., October 1984. (R)

4. OPERATION OF VESSELS

2020 Rearrangement of Ballast Water - M.V. Arctic

TP 5747 - Study on the Redisposition of Ballast Water in Deeply-Loaded Ballasted Icebreaking Conditions & Minimizing the Hull Bending Moment of M.V. Arctic (report and Addendum), Intercan Logistical Services Ltd., Canada Steamship Lines and Melville Shipping Ltd., June 1982.

2021 M.V. Arctic: Improvement in Ice Navigation

TP 5749 - Navigation in Ice in Darkness Study: Operational Evaluation of Night Viewing Devices, Report and Appendix, J.M. Robson, October 1982.

Appendix A: "Evaluation of Filters for Identifying Arctic Ice", National Research Council, Division of Building Research, October 1982.

TP 6706 - Fitting of a Viewing Port in the M.V. Arctic, Arctec Canada Ltd., March 1984.

TP 6708 - Initial Field Trials of a Shipboard Ice Navigation Support System, Phase I: Final Report, A.R. Sneyd, March 1984.

TP 6695 - Shipboard Ice Navigation Support System, Phase II; Final Report, A.R. Sneyd, March 1985.

2057 Ice Hazard Detection and Collission Avoidance

TP 5746 - Report on an Experimental Bow-mounted Radar System to Detect Ice Hazards; M.V. Arctic, J.M. Robson, March 1983.

TP 4216 - A Preliminary System Specification for the Ice Hazard Detection/Collision Avoidance System, Viatic Resource Systems Inc., 1982.

TP 4896 &

TP 4897 - Specification Investigation and Data Assessment of an Ice Hazard Detection/Collision Avoidance System, Viatic Resource Systems Inc., 1983.

TP 5917 - Remscan Feasibility Study, Canadian Marine Drilling Ltd., January 1985.

TP 5988 - Remscan Feasibility Study, Summary Report, Canadian Marine Drilling Ltd., January 1985.

2057 Ice Hazard Detection and Collision Avoidance (Cont'd)

TP 4435 - Detection and Avoidance of Hazardous Ice Conditions at Sea, A Review of R&D Activities in Canada, Nordco Ltd., 1983.

2064 Marine Simulator

TP 5623 - Ergonomic and Research Applications in the Development of an Arctic Shiphandling Simulator, Volumes I and II, Man-Machine Systems Ltd., February 1985.

2065 Communications Control Console Development

- Communications Control System Manual

2066 HF/MF Antenna Measurements - Arctic Installations

TP 6740 - Report on Arctic Communication Antenna Study - Eastern Arctic, July 1985.

TP 6737 - Report on Study of MF/HF/VHF Signal Level Requirements, July 1985.

2095 Refuelling - Polar Icebreaker

- Study of the Required Fuel Infrastructure Required to Support a Polar Icebreaker, Arctec Canada Ltd.

2097 Northwest Passage Communications Experiment

- VHF and UHF Propagation in the Canadian High Arctic, Communications Research Centre (CRC), (R.S. Butler).

2111 M.V. Columbiand: Trafficability

TP 5887 - 1982 Navigability Study - M.V. Columbiand, Martec Ltd., October 1984.

2115 NAWS - Hull Stress Warning System

TP 5317 - Test and Evaluation of NAWS: Hull Stress Monitor on CCGS Pierre Radisson, Summary Report, German & Milne Inc., March 1984.

TP 5322 - Test and Evaluation of NAWS: Hull Stress Monitor and CCGS Pierre Radisson, German & Milne Inc., March 1984.

2147 NAWS Repeater

TP 6289 - NAWS Repeater - Hull Stress Monitoring System
Repeater Unit, German & Milne Inc., March 1985.

2148 Arctic Marine Navigation Database Modelling

TP 7247 - Arctic Navigation Task Analysis: Database and
Modelling, Final Report, Human Factors North,
1985.

5. GOVERNMENT SERVICES

DFO 0520 Clearance Sweeping

- 1340 TR - A Feasibility, Requirements and Economic Study for Vertical Acoustic Sweep Systems for Use in the Arctic, Marinav Corp. December 1981.
- Arctic Vertical Acoustic Sweep System: Final Program Report, Internal Report, R.G. Burke, 1985

DFO 0510 Autonomous Remote-Controlled Submersible (ARCS)

- ISE Presents ARCS (Video), International Submarine Engineering Research Ltd., 1985.

DFO 0530 Arctic Sea Ice Studies

- Ocean Thermal Structure in the Western Canadian Arctic, Melling, H., R.A. Lake, D.R. Topham and D.B. Fissel, Cont. Shelf Res (3), 233-258, 1984.
- Anb Oceanographic survey of the Canadian Archipelago, March-April 1982, Fissel, D.B., D.N. Knight, and J.P. Birch, Can. Contract Rep. Hydrogr. Ocean Sci., 15, 1984.
- An Oceanographic survey of the Canadian Arctic Archipelago, March 1983, Fissel, D.B., D.D. Lemon, and D.N. Knight, Can. Contract. Rep. Hydrog. Ocean Sci; 16, 1984.
- Analysis of acoustic backscatter data, Barrow Strait - May 1984, Fissel, D.B., and D.D. Lemon, Final report on Contract FP941-4-1414, 1985.
- Arctic acoustic backscatter measurements - 1984. Lemon, D.D., G.R. Wilton, and C.J. McKay, Final report on Contract FP941-3-3638, 1984.

2058 Sea Ice Thickness Sensor

- TP 6606 - Development of an Antenna for a Remote Sea Ice Thickness Sensor, MPB Technologies, March 1984
- TP 6788 - Lake Melville Trial Using TDC/MPB Sea Ice Thickness Sensor, MPB Technologies, 1985.
- TP 4887 - Development of a Portable Sea Ice Thickness Sensor, Polar Tech Ltd., August 1983.
- TP 6816 - Development of a Portable Ice Thickness Sensor, Polar Tech Ltd., July 1985.

DOE 2 - Microwave Sensing of Sea Ice

- No reports yet

DOE 3 - Laser Profilometer

- No reports yet

DOE 1 - Marine Forecast System

- Surface-Pressure Analysis of System Movements (SPASM) - User's Manual, Atmospheric Environment Service, 1985
- The Scope of the Ice Accretion Problem in Canada Waters related to Offshore Energy and Transportation. CCC Report 85-13, Atmospheric Environment Service, 1985.
- FNOG Meteorological Database, 1985 Addendum, Acres International Inc., 1985.
- Marine Parser User's Manual, Acres International Inc., 1985.
- Incorporation of Ice Cover in a Storm Surge Model - Phase I, Atmospheric Dynamics Inc. 1985
- Development of a Graphical Data Entry System, H.G. Engineering Ltd., 1985
- Forecast Techniques for Ice Accretion on Different Types of Marine Structures, Including Ships, Platforms, and Coastal Facilities, R.J. Jessup, WMO Marine Meteorology Report #15.
- Modification of the Perfect Prog Database to provide for Model Output Statistics Development, Final Report, Acres International Inc., 1984.
- Development of a Prototype Freezing Spray Prediction System", Final Report, The MEP Company, 1983.
- Testing and Future Application of the Donelan Lakewave Test Model, Meteorological Services Research Branch, Internal Report #83-4, 1983
- Design Plan and Output Specifications for an Enhanced Arctic Marine Forecast System, PGF Services, Ltd., 1983.

2022 M.V. Arctic Ice Regime Studies

- TP 6707 - Summer Ice Regime in McDougall Sound and Adjacent Channels, Volume 1, Main Report and Summary, Polar Research and Engineering, October 1982.
- TP 6704 - Ice Trafficability in Northern Baffin Bay (June 1 to July 15, 1982), Polar Research and Engineering, March 1983.
- TP 6759 - Ice Regime Study: Report on Observations Program (1982 Season), M. Robson, March 1983.
- TP 6701 - Final Report: M.V. Arctic Northern Routing Environment, Melville Marine Consultancy, March 1983.
- TP 6705 - Track Observations in Ice Cover of Admiralty Inlet Following Passage of M.V. Arctic (June/July, 1982), M. Robson, March 1983.
- TP 6712 - Evaluation of 1982 Ice Conditions Using March (SLAR) and July (Photographic) Surveys of Wellington, Queens Channels and McDougall Sound: Report and Appendices, FMS Engineers and Lavalin, April 1983.

2072 Maintenance of Arctic Ports and Harbours

- TP 4156 - Ice Control for Arctic Ports and Harbours, Summary Report, Acres Consulting Services Ltd., 1983.
- TP 3967 - Ice Control for Arctic Ports and Harbours, Final Report, Volume I and II, Acres Consulting Services Ltd., 1982.
- TP 4016 - Little Cornwallis Island Ice Cutting Trials, Acres Consulting Services Ltd., 1982.

2070 Air Cushion Icebreaking Platform

- TP 3405 - Concept for an Icebreaker with an Integral Fluid Cushion Bow, Davis Engineering Ltd., 1981.
- TP 3406 - Concepts for an Icebreaker with Integral Air Cushion Bow, Canfin Arctic Consultants Ltd., 1981.
- TP 3407 - Concepts for the Integration of a Fluid Cushion into the Bow of a Ship, German & Milne Inc., 1982.

2070 Air Cushion Icebreaking Platform (Cont'd)

- TP 4086 - 1981/82 ACIB Evaluation: Data Collection and Analysis, Arctec Canada Ltd., 1983.
- TP 4446 - Air Cushion Icebreaking Bow (ACIB), Operations Report 1982/83, German & Milne Inc., 1983.
- TP 5497 - Air Cushion Icebreaking Bow (ACIB) Operations Report 1983/84, German & Milne Inc., 1984.
- TP 5079 - Inspection and Evaluation of the CCG Air Cushion Icebreaking Bow, German and Milne Inc., 1984.

2113 Ultrasonic Doppler Velocimeter

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